Introduction to R Software

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Lecture 16

Loops

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Slides can be downloaded from

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Control structures in R :

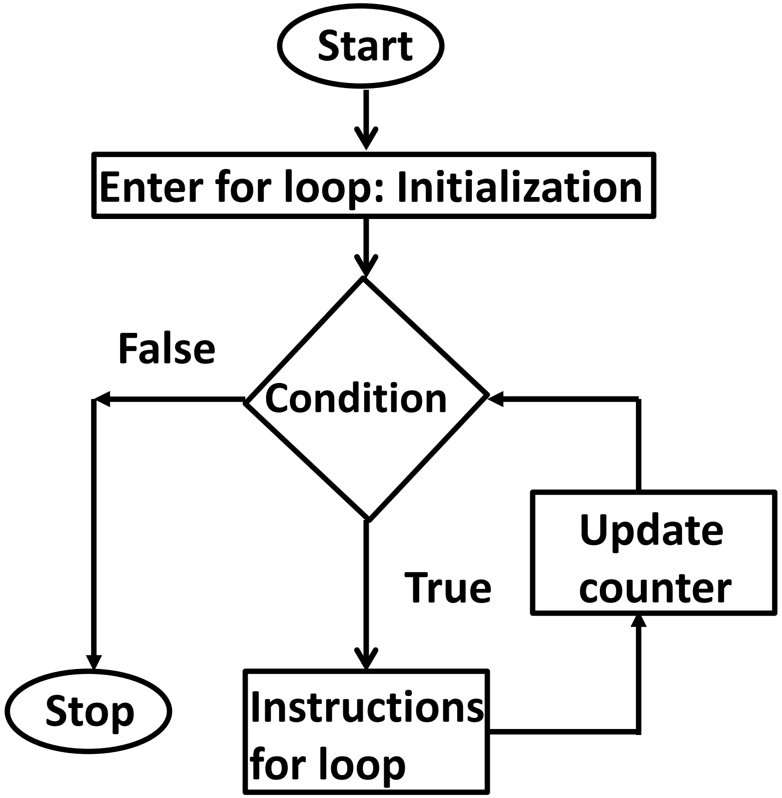
Loops

Repetitive commands are executed by loops

- **for loop**
- **while loop**
- **repeat loop**

1. The `for` loop

If the number of repetitions is known in advance (e.g. if all commands have to be executed for all cases *i* = 1,2,...,*n* in the data), a `for()` loop can be used.



1. The `for` loop

Syntax

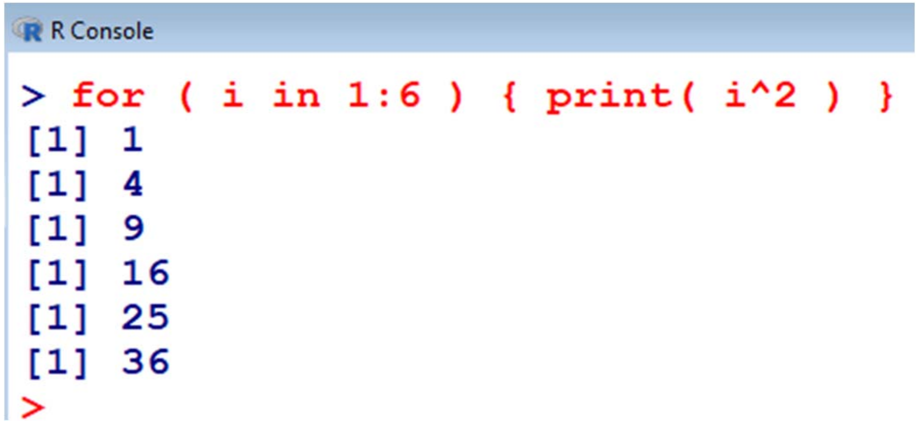
```
for (name in vector) {commands to be executed}
```

A variable with name `name` is sequentially set to all values, which contained in the vector vector.

All operations/commands are executed for all these values.

Example -1

```
> for ( i in 1:6 ) { print( i^2 ) }
[1] 1
[1] 4
[1] 9
[1] 16
[1] 25
[1] 36
```

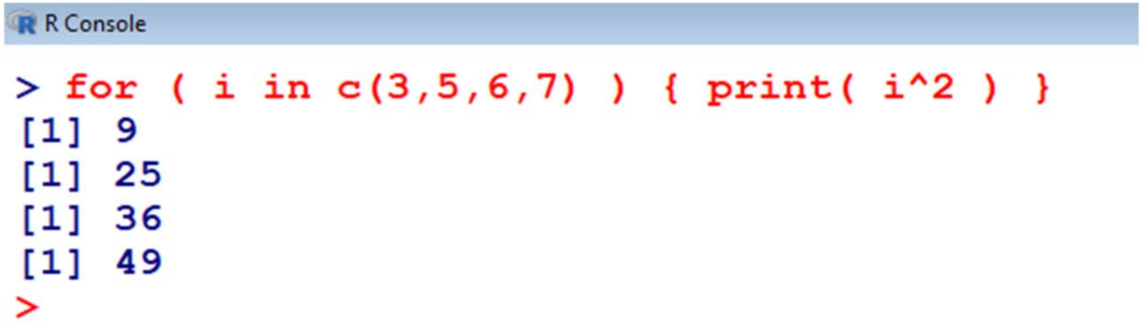


```
> for ( i in 1:6 ) { print( i^2 ) }
[1] 1
[1] 4
[1] 9
[1] 16
[1] 25
[1] 36
>
```

Example -1

Note: `print` **is a function to print the argument**

```
> for ( i in c(3,5,6,7) ) { print( i^2 ) }
[1] 9
[1] 25
[1] 36
[1] 49
```



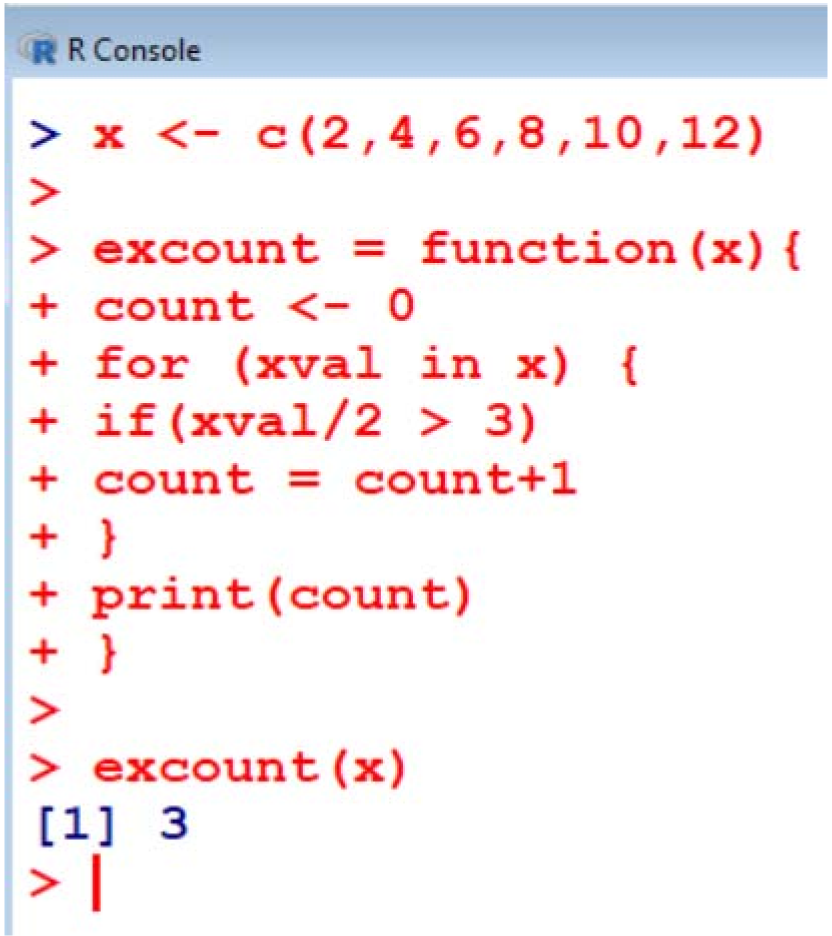
```
> for ( i in c(3,5,6,7) ) { print( i^2 ) }
[1] 9
[1] 25
[1] 36
[1] 49
>
```

Example -2

```
x <- c(2,4,6,8,10,12)

excount = function(x){
count <- 0
for (xval in x) {
if(xval/2 > 3)
count = count+1
}
print(count)
}
> excount(x)
[1] 3
```

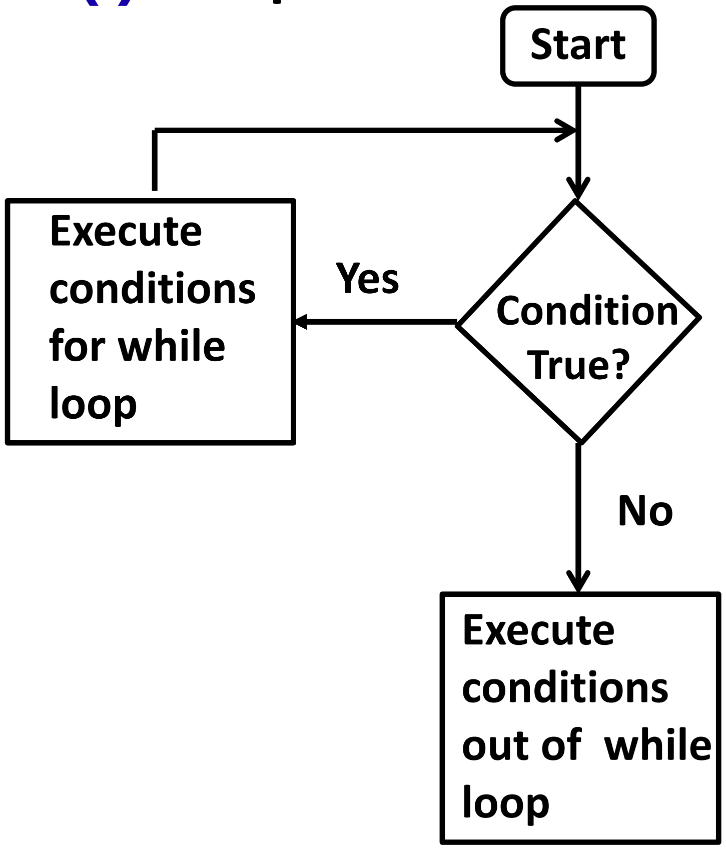
Example -2



```
> x <- c(2,4,6,8,10,12)
>
> excount = function(x){
+ count <- 0
+ for (xval in x) {
+ if(xval/2 > 3)
+ count = count+1
+ }
+ print(count)
+ }
>
> excount(x)
[1] 3
> 
```

2. The `while` loop

If the number of loops is not known in before, e.g. when an iterative algorithm to maximize a likelihood function is used, one can use a `while()` loop.


Start
Execute conditions for while loop
Yes
Condition True?
No
Execute conditions out of while loop

2. The `while` loop

Syntax

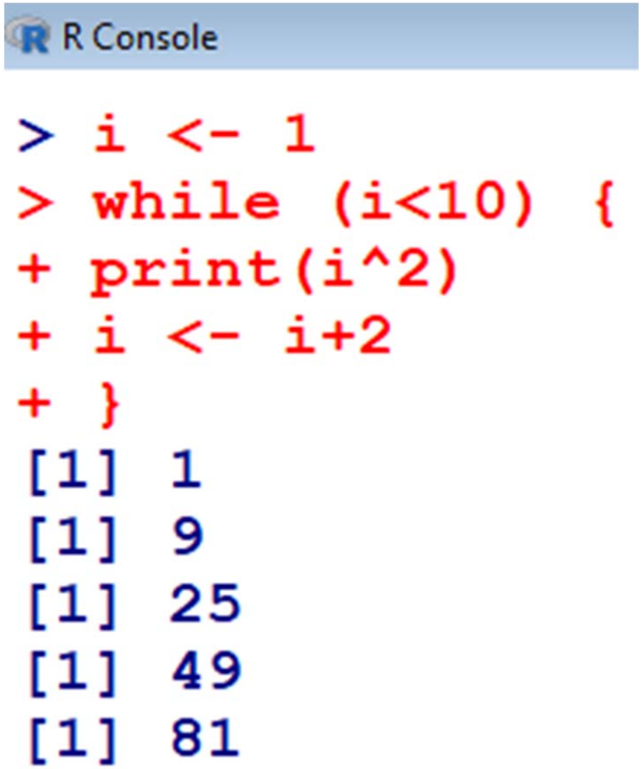
```
while(condition){ commands to be executed as
long as condition is TRUE }
```

If the condition is not true *before entering* the loop, no commands within the loop are executed.

2. The while loop

Example 1

```
> i <- 1
> while (i<10) {
+ print(i^2)
+ i <- i+2
+}
[1] 1
[1] 9
[1] 25
[1] 49
[1] 81
```



```
> i <- 1
> while (i<10) {
+ print(i^2)
+ i <- i+2
+ }
[1] 1
[1] 9
[1] 25
[1] 49
[1] 81
```

2. The while loop

Example 2

```
sumfunction = function(){
sum = 0
number <- as.integer(readline(prompt="Kripya
25 ke neechey ki sankhya chuney:  "))
while (number <= 25)  {
  sum = sum + number
  number = number + 1 }
print(paste("While Loop ke dwara prapt numbers
ka kul yog:  ", sum))
}
```

2. The `while` loop

Example 2

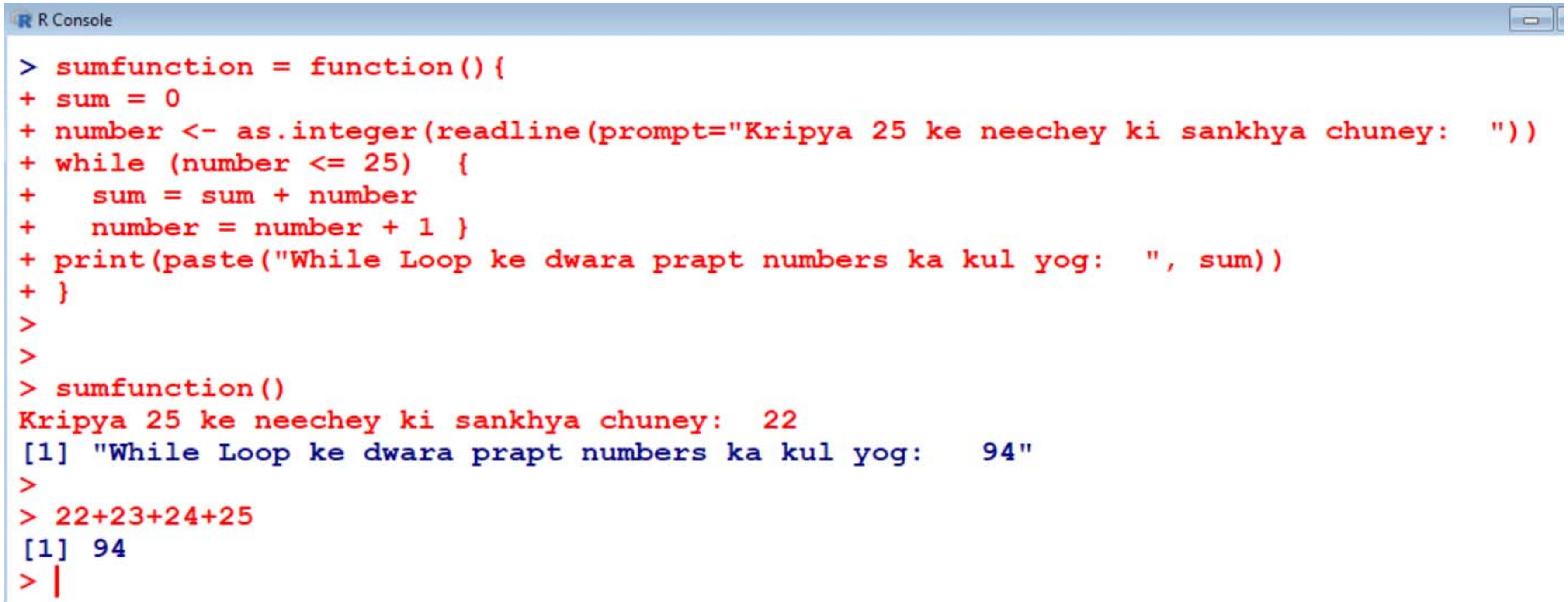
```
> sumfunction()
Kripya 25 ke neechey ki sankhya chuney:  22
[1] "While Loop ke dwara prapt numbers ka kul
yog:   94"



> 22+23+24+25
[1] 94
```

2. The while loop

Example



```
> sumfunction = function(){
+ sum = 0
+ number <- as.integer(readline(prompt="Kripya 25 ke neechey ki sankhya chuney:  "))
+ while (number <= 25)   {
+   sum = sum + number
+   number = number + 1 }
+ print(paste("While Loop ke dwara prapt numbers ka kul yog:   ", sum))
+ }
>
>
> sumfunction()
Kripya 25 ke neechey ki sankhya chuney:  22
[1] "While Loop ke dwara prapt numbers ka kul yog:    94"
>
> 22+23+24+25
[1] 94
> |
```